

PC 1.5 Combinations of Functions

Objectives: Combine functions using operations; form a composite function; determine the domain of a composite function.

If two functions share a common domain, the following operations may be performed:

Basic Operations with Functions

Sum $(f + g)(x) = f(x) + g(x)$

Difference $(f - g)(x) = f(x) - g(x)$

Product $(f \cdot g)(x) = f(x) \cdot g(x)$

Quotient $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}, \text{ if } g(x) \neq 0$

Work # 1-5

Composition of Functions

Given two functions f and g , the composition of f with g is

$$(f \circ g)(x) = f(g(x))$$

for all x in the domain of g such that $g(x)$ is in the domain of f .

Evaluate the inside function then substitute the value of $g(x)$ into $f(x)$.

Work #6-9

Domain of a Composite Function

- **Any x not in the domain of g must be excluded from the composition (inside function)**
- **You must also determine the domain of the function after composition (outside function)**

Work # 10-13

“de”composing a function – find two functions whose composition yields the given function

Work # 14-18